MC 87-I-28 B(P)

PRELIMINARY REPORT
INDUSTRY SERIES

1987
Census of Manufactures

MC87-I-28B(P)
Issued June 1989

PLASTICS MATERIALS, SYNTHETIC RUBBER, AND MANMADE FIBERS

Industries 2821, 2822, 2823, and 2824

INTRODUCTION

This report presents preliminary statistics from the 1987 Census of Manufactures for those establishments classified in the industries listed above. These data will be superseded by a more comprehensive final paperbound report. The method of data collection and use of administrative data are discussed in detail in the appendix.

All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The definitions of these industries are the same as those used in the 1987 Standard Industrial Classification (SIC) Manual.[1]

INDUSTRY 2821, PLASTICS MATERIALS AND RESINS

In the 1987 Census of Manufactures, Industry 2821, Plastics Materials and Resins, had employment of 55.9 thousand. The employment figure was 2 percent above the 54.7 thousand reported in 1982. Compared with 1986, employment in 1987 increased 2 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was $26.1 billion.

In 1987, establishments in this industry accounted for 81 percent of products considered primary to the industry regardless of the industry in which they were produced (coverage ratio). In 1982, the coverage ratio was 77. The products primary to this industry appear in table 2 and aggregated to $27.7 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to $15.3 billion in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 2822, SYNTHETIC RUBBER

In the 1987 Census of Manufactures, Industry 2822, Synthetic Rubber, had employment of 10.8 thousand. The employment figure was 9 percent below the 11.9 thousand reported in 1982. Compared with 1986, employment in 1987 increased 13 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was $3.3 billion.

In 1987, establishments in this industry accounted for 73 percent of products considered primary to the industry regardless of the industry in which they were produced (coverage ratio). In 1982, the coverage ratio was 78. The products primary to this industry appear in table 2 and aggregated to $3.5 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to $2.1 billion in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 2823, CELLULOSIC MANMADE FIBERS

In the 1987 Census of Manufactures, Industry 2823, Cellulosic Manmade Fibers, had employment of 10.6 thousand. The employment figure was 25 percent below the

[1]**Standard Industrial Classification Manual: 1987.** For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock No. 041-001-00314-2.

Address inquiries to Bureau of the Census, Industry Division, Washington, DC 20233, or call **Andrew W. Hait** (301) 763-2510.

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14.2 thousand reported in 1982. Compared with 1986, employment in 1987 decreased 12 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was $1.3 billion. The products primary to this industry appear in table 2 and aggregated to $1.2 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to $675.0 million in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 2824, ORGANIC FIBERS, NONCELLULOSIC

In the 1987 Census of Manufactures, Industry 2824, Organic Fibers, Noncellulosic, had employment of 45.7 thousand. The employment figure was 24 percent below the 60.2 thousand reported in 1982. Compared with 1986, employment in 1987 decreased 5 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was $10.1 billion. The products primary to this industry appear in table 2 and aggregated to $8.9 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to $5.2 billion in 1987. Data on specific materials consumed appear in table 3.

ABBREVIATIONS AND SYMBOLS

The following abbreviations and symbols are used in the tables in this publication:

-	Represents zero.
(D)	Withheld to avoid disclosing data for individual companies; data are included in higher level totals.
(NA)	Not available.
(NC)	Not comparable.
(S)	Withheld because estimate did not meet publication standards on the basis of either the response rate or a consistency review.
(X)	Not applicable.
(Z)	Less than half the unit shown.
do	Ditto.
n.e.c.	Not elsewhere classified.
n.s.k.	Not specified by kind.
pt.	Part.
r	Revised.
SIC	Standard Industrial Classification.

Other abbreviations, such as lb, gal, yd, doz, bbl, and s tons, are used in the customary sense.

CONTACTS FOR DATA USERS

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Census/ASM		
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Import/Export Publications	Foreign Trade Division	(301) 763-5140
Industry Analysis and Forecasts	International Trade Administration	(202) 377-4356

Table 1. Historical Statistics for the Industry: 1987 and Earlier Years

[Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendix.]

Year[1]	Companies[2] (no.)	All establishments[3] Total (no.)	All establishments[3] With 20 employees or more (no.)	All employees Number (1,000)	All employees Payroll (million dollars)	Production workers Number (1,000)	Production workers Hours (millions)	Production workers Wages (million dollars)	Value added by manufacture[4] (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	End-of-year inventories[4] (million dollars)	Ratios Specialization (percent)	Ratios Coverage (percent)
INDUSTRY 2821, PLASTICS MATERIALS AND RESINS															
1987 Census	286	473	315	55.9	1 993.2	34.7	75.2	1 145.9	10 876.3	15 304.9	26 143.8	1 166.7	2 483.3	87	81
1986 ASM	(NA)	(NA)	(NA)	54.7	1 893.6	34.1	72.2	1 087.5	8 149.4	13 233.7	21 483.7	1 264.2	2 393.6	(NA)	(NA)
1985 ASM	(NA)	(NA)	(NA)	55.4	1 818.6	34.4	71.1	1 019.1	7 036.3	13 201.3	20 261.8	1 115.1	2 374.7	(NA)	(NA)
1984 ASM	(NA)	(NA)	(NA)	54.2	1 650.9	33.2	69.8	930.6	7 653.9	13 298.9	20 776.3	925.3	2 256.5	(NA)	(NA)
1983 ASM	(NA)	(NA)	(NA)	53.2	1 505.6	32.7	67.3	863.9	6 716.7	12 298.4	18 935.8	756.4	2 173.9	(NA)	(NA)
1982 Census	263	440	308	54.7	1 433.9	32.8	67.4	790.0	4 746.0	10 807.3	15 769.2	898.8	1 891.8	87	77
1981 ASM	(NA)	(NA)	(NA)	57.7	1 404.5	35.8	73.8	794.5	5 000.4	11 853.6	16 675.5	904.2	1 839.7	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	58.8	1 317.3	36.6	75.9	738.2	5 162.8	9 847.4	14 908.2	1 233.8	1 651.6	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	60.3	1 231.0	38.4	80.6	714.1	5 367.4	8 996.7	14 282.4	1 221.2	1 408.9	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	57.6	1 080.2	36.9	77.1	638.2	4 442.6	7 595.3	11 997.5	972.4	1 158.7	(NA)	(NA)
1977 Census	221	397	310	57.2	985.6	36.7	76.6	575.7	4 142.7	6 772.6	10 818.2	895.2	1 093.6	85	74
1976 ASM	(NA)	(NA)	(NA)	56.2	869.4	36.4	73.0	500.5	3 524.4	5 790.1	9 201.9	746.4	964.0	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	54.3	771.6	34.0	68.7	433.0	2 770.5	4 351.4	7 043.1	637.8	819.4	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	57.7	763.5	37.6	77.8	440.8	3 640.1	4 317.4	7 773.0	647.9	788.5	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	54.4	654.4	35.0	74.1	387.6	2 490.0	2 628.4	5 159.4	330.7	434.5	(NA)	(NA)
1972 Census	193	323	263	54.8	632.8	35.0	74.3	370.0	2 160.5	2 328.2	4 478.2	253.2	467.7	81	79
INDUSTRY 2822, SYNTHETIC RUBBER															
1987 Census	102	112	38	10.8	402.1	7.0	15.3	232.8	1 260.6	2 095.5	3 309.6	171.2	411.0	80	73
1986 ASM	(NA)	(NA)	(NA)	9.6	336.5	6.3	12.9	199.7	1 099.2	1 594.1	2 739.8	116.6	309.4	(NA)	(NA)
1985 ASM	(NA)	(NA)	(NA)	9.8	323.1	6.3	12.6	191.3	920.0	1 906.3	2 840.6	117.5	379.5	(NA)	(NA)
1984 ASM	(NA)	(NA)	(NA)	10.7	357.1	7.0	13.9	213.5	1 167.6	2 279.6	3 408.6	(D)	408.4	(NA)	(NA)
1983 ASM	(NA)	(NA)	(NA)	11.1	343.3	7.1	14.1	202.3	959.0	2 160.1	3 148.6	101.5	367.0	(NA)	(NA)
1982 Census	63	78	35	11.9	343.7	7.6	15.0	197.5	908.9	2 226.8	3 156.4	246.4	382.1	80	78
1981 ASM	(NA)	(NA)	(NA)	11.2	298.4	7.3	14.5	178.4	811.0	2 205.4	2 995.0	145.5	242.1	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	11.4	276.4	7.4	14.7	163.6	810.4	1 853.9	2 660.3	100.4	197.0	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	12.1	266.6	8.2	16.6	165.6	884.5	1 753.2	2 634.0	66.4	186.5	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	10.1	202.5	7.3	14.5	135.1	574.2	1 409.8	1 972.2	48.1	166.2	(NA)	(NA)
1977 Census	56	63	30	10.0	185.2	7.1	14.2	125.7	568.6	1 294.8	1 863.3	53.2	154.3	91	71
1976 ASM	(NA)	(NA)	(NA)	10.6	172.3	7.6	14.9	113.7	510.7	1 208.0	1 702.3	46.4	153.0	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	9.8	147.7	7.0	13.6	96.8	468.8	971.9	1 455.7	30.9	129.1	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	10.7	143.8	7.5	14.9	93.6	531.5	994.6	1 481.1	35.3	157.2	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	11.2	142.7	7.8	15.3	92.1	475.2	683.4	1 167.6	46.1	112.2	(NA)	(NA)
1972 Census	50	59	34	11.8	138.8	8.2	16.2	88.5	491.7	610.6	1 089.4	35.5	115.9	90	74
INDUSTRY 2823, CELLULOSIC MANMADE FIBERS															
1987 Census	6	7	7	10.6	283.0	8.0	16.7	182.2	641.3	675.0	1 329.6	24.2	129.5	(D)	(D)
1986 ASM	(NA)	(NA)	(NA)	12.0	314.4	9.0	18.3	200.4	615.7	713.2	1 321.8	54.9	148.0	(NA)	(NA)
1985 ASM	(NA)	(NA)	(NA)	12.1	311.3	9.0	18.4	199.4	390.2	744.7	1 148.1	43.3	138.6	(NA)	(NA)
1984 ASM	(NA)	(NA)	(NA)	13.3	320.9	10.0	19.7	212.1	489.3	813.1	1 307.2	(D)	159.4	(NA)	(NA)
1983 ASM	(NA)	(NA)	(NA)	14.4	311.0	10.7	21.1	198.0	522.7	934.1	1 445.0	44.4	185.2	(NA)	(NA)
1982 Census	5	9	9	14.2	291.0	10.8	21.0	194.5	428.7	806.8	1 239.9	88.4	147.3	(D)	(D)
1981 ASM	(NA)	(NA)	(NA)	15.6	299.8	12.2	24.5	209.0	504.8	929.4	1 424.0	111.8	107.7	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	16.1	279.0	12.7	25.1	196.7	474.6	877.8	1 357.3	83.2	97.9	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	17.0	269.8	13.6	26.9	195.8	462.9	788.5	1 244.9	83.7	103.6	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	17.1	246.2	13.7	27.3	179.6	365.4	731.5	1 105.0	32.7	96.7	(NA)	(NA)
1977 Census	5	10	10	15.9	212.8	12.5	25.1	151.2	325.7	680.8	998.9	29.3	110.8	(D)	(D)
1976 ASM	(NA)	(NA)	(NA)	16.7	202.9	12.8	25.0	137.9	349.0	596.5	944.1	41.6	123.1	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	15.9	178.5	12.0	22.9	119.3	302.8	516.3	836.3	69.9	127.3	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	20.5	205.1	16.2	31.8	144.2	356.7	592.2	926.4	57.1	142.1	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	16.7	134.0	14.3	29.7	107.1	284.0	343.0	641.4	30.2	85.2	(NA)	(NA)
1972 Census	13	18	12	17.1	135.2	14.4	29.6	107.1	243.5	327.8	589.5	32.7	97.4	(D)	(D)
INDUSTRY 2824, ORGANIC FIBERS, NONCELLULOSIC															
1987 Census	51	75	65	45.7	1 347.1	34.4	70.5	894.3	5 062.3	5 154.7	10 114.0	459.3	1 313.7	85	(NA)
1986 ASM	(NA)	(NA)	(NA)	48.0	1 397.8	35.7	70.3	923.7	4 287.4	5 371.1	9 676.7	461.9	1 241.4	(NA)	(NA)
1985 ASM	(NA)	(NA)	(NA)	50.9	1 408.7	37.0	72.2	909.8	3 851.0	5 349.1	9 283.7	354.3	1 226.1	(NA)	(NA)
1984 ASM	(NA)	(NA)	(NA)	54.1	1 438.0	39.8	78.0	923.7	4 367.0	5 633.6	9 919.9	334.9	1 334.4	(NA)	(NA)
1983 ASM	(NA)	(NA)	(NA)	55.3	1 381.9	40.6	76.9	881.8	4 196.8	5 261.8	9 463.1	257.4	1 266.5	(NA)	(NA)
1982 Census	44	70	57	60.2	1 382.0	43.1	79.6	869.9	3 317.9	4 959.4	8 262.7	442.9	1 223.0	85	[5]81
1981 ASM	(NA)	(NA)	(NA)	62.6	1 351.0	45.7	86.7	868.7	3 894.4	5 804.2	9 602.2	444.5	876.4	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	65.3	1 285.3	47.7	90.9	826.3	3 312.5	5 181.8	8 529.9	503.2	811.6	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	70.8	1 252.3	52.7	103.0	819.6	3 428.7	4 823.2	8 227.2	448.7	792.9	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	72.4	1 170.0	53.6	104.1	758.8	3 220.5	3 732.6	6 921.0	487.5	740.3	(NA)	(NA)
1977 Census	37	66	58	74.0	1 086.1	54.8	105.8	704.8	2 804.4	3 618.1	6 379.7	338.5	661.8	84	579
1976 ASM	(NA)	(NA)	(NA)	69.3	942.3	50.2	94.9	594.4	2 263.7	3 092.9	5 307.3	534.2	587.8	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	70.2	887.0	51.0	97.3	556.9	1 983.0	2 752.1	4 933.8	700.9	549.3	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	80.9	911.1	60.5	118.4	595.1	2 410.9	2 617.7	4 716.1	587.1	792.4	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	81.8	837.9	61.5	122.3	556.5	2 819.0	1 655.8	4 751.2	422.8	392.6	(NA)	(NA)
1972 Census	35	61	55	78.2	759.5	58.4	116.2	497.7	2 031.1	1 588.3	3 601.4	372.5	444.5	80	97

Note: Establishments of single unit companies with up to 20 employees (cutoff varied by industry) were excluded from the mail portion of the census. Data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were estimated based on administrative-record information from other agencies in conjunction with industry averages. These establishments accounted for the following percent of total value of shipments: SIC 2821, 4%; SIC 2822, 3%; SIC 2823, 0%; SIC 2824, 1%.

[1]In annual survey of manufactures (ASM) years, data are estimates based on a representative sample of establishments canvassed annually and may differ from results of a complete canvass of all establishments. ASM publication shows percentage standard errors. Unless otherwise noted, for data prior to 1972, see 1972 Census of Manufactures, vol. II, table 1a of the Industry chapter.

[2]For the census, a company is defined as a business organization consisting of one establishment or more under common ownership or control.

[3]Includes establishments with payroll at any time during year.

[4]Beginning with the 1982 Census of Manufactures, all respondents were requested to report their inventories at (the lower of) cost or market prior to adjustment to LIFO cost. This is a change from prior Censuses and annual surveys of manufactures in which respondents were permitted to value their inventories using any generally accepted accounting method. Consequently, inventories and value added by manufacture reported for 1982 and later years are not comparable to prior-year data.

[5]1972 coverage ratio is not comparable. Calculation of ratios for subsequent census years includes shipments of textured, crimped, or bulked filament yarns made from purchased yarns.

Table 2. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987		1982	
		Number of companies with shipments of $100,000 or more	Value of product shipments[1] (million dollars)	Number of companies with shipments of $100,000 or more	Value of product shipments[1] (million dollars)
2821- —	**PLASTICS MATERIALS AND RESINS**				
	Total	**(NA)**	**27 697.6**	**(NA)**	**17 614.8**
28213 —	Thermoplastic resins and plastics materials:				
28213 00	Thermoplastic resins and plastics materials, including resins for protective coatings (for detailed statistics see U.S. International Trade Commission publication, Synthetic Organic Chemicals, 1987 and 1982)	188	22 346.7	189	14 251.6
28214 —	Thermosetting resins and plastics materials:				
28214 00	Thermosetting resins and plastics materials, including resins for protective coatings (for detailed statistics see U.S. International Trade Commission publication, Synthetic Organic Chemicals, 1987 and 1982)	130	4 780.8	135	2 877.9
28210 —	Plastics materials and resins, n.s.k.	(NA)	570.2	(NA)	485.3
28210 00	Plastics materials and resins, n.s.k., typically for establishments with 5 employees or more (see note)	(NA)	570.2	(NA)	485.3
28210 02	Plastics materials and resins, n.s.k., typically for establishments with less than 5 employees (see note)	-	-	-	-
2822- —	**SYNTHETIC RUBBER**				
	Total	**(NA)**	**3 452.2**	**(NA)**	**3 212.2**
28220 —	Synthetic rubber:				
28220 00	Synthetic rubber, vulcanizable elastomers (for additional detail, see Current Industrial Report MA-30A, Rubber: Production, Shipments, and Inventories and U.S. ITC publication, Synthetic Organic Chemicals, 1987 and 1982)	51	3 389.6	41	3 187.8
28220 02	Synthetic rubber (vulcanizable elastomers), n.s.k., typically for establishments with less than 5 employees (see note)	(NA)	62.6	(NA)	24.4

1987 product code	Product	1987				1982			
		Number of companies with shipments of $100,000 or more	Quantity of production for all purposes	Product shipments[1]		Number of companies with shipments of $100,000 or more	Quantity of production for all purposes	Product shipments[1]	
				Quantity[2]	Value (million dollars)			Quantity[2]	Value (million dollars)
2823- —	**CELLULOSIC MANMADE FIBERS**								
	Total	**(NA)**	**(X)**	**(X)**	**1 228.7**	**(NA)**	**(X)**	**(X)**	**1 114.8**
28230 —	Rayon and acetate fibers:								
	Yarn, including strip:								
28230 34	High tenacity yarn (less than 67 decitex) — mil lb								
28230 36	Producer textured (see also code 22825) — do	6	(NA)	305.7	453.4	7	(NA)	311.8	408.9
28230 38	Other yarn of less than 67 decitex (60 denier) — do								
28230 39	Yarn of 67 decitex or more — do								
28230 41	Staple — do	7	(X)	745.1	766.6	6	(X)	701.2	704.8
28230 71	Other, including tow and salable waste for textile use — do								
28230 00	Cellulosic manmade fibers, n.s.k., typically for establishments with 10 employees or more (see note)	(NA)	(X)	(X)	8.7	(NA)	(X)	(X)	1.2
28230 02	Cellulosic manmade fibers, n.s.k., typically for establishments with less than 10 employees (see note)	-	(X)	(X)	-	-	(X)	(X)	-
2824- —	**MANMADE ORGANIC FIBERS, NONCELLULOSIC**								
	Total	**(NA)**	**(X)**	**(X)**	**8 871.7**	**(NA)**	**(X)**	**(X)**	**7 149.8**
28241 —	Nylon and other polyamide fibers, except producer textured — mil lb	(NA)	(X)	(X)	3 418.2	(NA)	(X)	1 289.2	1 891.1
	Yarn, including strip:								
28241 13	High tenacity yarn (less than 67 decitex) — mil lb								
28241 19	Single yarn, less than 67 decitex, not twisted or with a twist not exceeding 50 turns per meter — do								
28241 21	Single yarn, less than 67 decitex, with a twist exceeding 50 turns per meter — do	10	(X)	1 890.1	2 192.3	9	(X)	560.6	1 051.6
28241 23	Multiple or cable yarn, less than 67 decitex — do								
28241 25	Yarn of 67 decitex or more — do								
28241 33	Staple — do	7	(X)	976.7	1 064.4	6	(X)	567.5	693.2
28241 35	Tow — do	1	(X)	(D)	(D)	1	(X)	(D)	(D)
28241 43	Salable waste for textile use — do	5	(X)	(D)	(D)	5	(X)	(D)	(D)
28241 00	Nylon and other polyamide fibers, except producer textured, n.s.k.	(NA)	(X)	(X)	9.2	-	(X)	(X)	-
28244 —	Polyester, except producer textured — mil lb	(NA)	(X)	4 018.3	2 905.7	(NA)	(X)	3 230.5	2 679.1
	Yarn, including strip:								
28244 32	High tenacity yarn (less than 67 decitex) — mil lb								
28244 34	Single yarn, less than 67 decitex, not twisted or with a twist not exceeding 50 turns per meter — do								
28244 36	Single yarn, less than 67 decitex, with a twist exceeding 50 turns per meter — do	12	(X)	1 235.0	1 212.0	14	(X)	(D)	(D)
28244 38	Multiple or cable yarn less than 67 decitex — do								
28244 41	Yarn of 67 decitex or more — do								
28244 43	Staple — do	10	(X)	1 863.1	1 119.8	7	(X)	1 308.9	943.0
28244 45	Tow and fiberfill — do	4	(X)	860.3	557.3	4	(X)	(D)	(D)
28244 47	Salable waste for textile use — do	6	(X)	59.9	16.6	5	(X)	(D)	(D)
28244 00	Polyester, except producer textured, n.s.k.	-	(X)	(X)	-	-	(X)	(X)	-

See footnotes at end of table.

Table 2. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987				1982			
		Number of companies with shipments of $100,000 or more	Quantity of production for all purposes	Product shipments[1]		Number of companies with shipments of $100,000 or more	Quantity of production for all purposes	Product shipments[1]	
				Quantity[2]	Value (million dollars)			Quantity[2]	Value (million dollars)
2824- --	**MANMADE ORGANIC FIBERS, NONCELLULOSIC —Con.**								
28247 --	Other noncellulosic manmade fibers, except producer textured (except glass, carbon, and graphite)	(NA)	(X)	(X)	1 529.4	(NA)	(X)	(X)	1 041.3
	Yarn, including strip:								
28247 13	Single yarn, less than 67 decitex, not twisted or with a twist not exceeding 50 turns per meter (mil lb)	13	(X)	305.1	806.7	10	(X)	(D)	(D)
28247 15	Single yarn, less than 67 decitex, with a twist exceeding 50 turns per meter (do)								
28247 16	Multiple or cable yarn, less than 67 decitex (do)								
28247 19	Yarn of 67 decitex or more (do)								
	Staple:								
28247 31	Acrylic (mil lb)	4	(X)	533.7	454.3	8	(X)	(D)	(D)
28247 33	All other (do)	5	(X)	(D)	(D)	7	(X)	(D)	(D)
28247 41	Other (including tow and salable waste for textile use) (do)	5	(X)	(D)	(D)				
28247 00	Other noncellulosic manmade fibers, except producer textured, n.s.k.	(NA)	(X)	(X)	1.0	(NA)	(X)	(X)	1.5
28248 --	Producer textured noncellulosic manmade fibers (see also code 22825) (mil lb)	(NA)	604.5	613.4	990.6	(NA)	969.8	1 014.5	1 519.7
28248 15	Nylon and other polyamides (do)	5	449.6	458.3	770.0	5	535.6	552.9	909.2
28248 51	Polyester (do)	2	(D)	(D)	(D)	7	245.7	257.6	288.2
28248 81	Other noncellulosic manmade fibers (do)	6	(D)	(D)	(D)	8	179.1	195.0	316.3
28248 00	Producer textured noncellulosic manmade fibers, n.s.k. (do)	-	(X)	(X)	-	(NA)	9.4	9.0	6.0
28240 --	Manmade organic fibers, noncellulosic, n.s.k.	(NA)	(X)	(X)	27.8	(NA)	(X)	(X)	18.6
28240 00	Manmade organic fibers, noncellulosic, n.s.k., typically for establishments with 10 employees or more (see note)	(NA)	(X)	(X)	22.9	(NA)	(X)	(X)	12.7
28240 02	Manmade organic fibers, noncellulosic, n.s.k., typically for establishments with less than 10 employees (see note)	(NA)	(X)	(X)	4.9	(NA)	(X)	(X)	5.9

Note: In 1987 Census of Manufactures, data for establishments of small single unit companies with up to 20 employees were estimated from administrative-record data rather than data actually collected from respondents. Employment cutoffs used for administrative records for each industry and shipments figures are included in code ending with "002". In both 1987 and 1982 Censuses of Manufactures, products not completely identified on standard forms were coded in appropriate product class (five-digit) followed by "00" or to appropriate product group code (four-digit) followed by "000".

[1]Data reported by all producers, not just those with shipments of $100,000 or more.

[2]For some establishments, data have been estimated from central unit values which are based on quantity-value relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

Table 3. Materials Consumed by Kind: 1987 and 1982

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity[1]	Delivered cost (million dollars)	Quantity[1]	Delivered cost (million dollars)
	INDUSTRY 2821, PLASTICS MATERIALS AND RESINS				
	Materials, containers, and supplies	**(X)**	**13 829.7**	**(X)**	**9 605.7**
	Synthetic organic chemicals:				
	Cyclic crudes and intermediates:				
286516	Styrene (100%) (mil lb)	5 042.6	1 678.5	2 917.5	931.3
286513	Phenol (100%) (do)	(S)	367.9	649.9	181.0
286505	Other cyclic crudes and intermediates (including melamine, phthalic anhydride, and benzene)	(X)	385.1	(D)	(D)
286535	Synthetic organic dyes, pigments, lakes, and toners (100%) (mil lb)	(S)	91.9	(S)	13.4
	Other synthetic organic chemicals:				
286925	Acrylates and methacrylates, monomers (100%) (mil lb)	(S)	575.5	980.0	541.1
286920	Alcohols, except ethyl (100%) (do)	903.1	119.2	(S)	108.3
286923	Formaldehyde (100% HCH0) (do)	2 354.2	117.3	801.9	115.0
286933	Rubber processing chemicals (accelerators, antioxidants, blowing agents, inhibitors, peptizers, etc.)	(X)	113.4	(X)	45.7
286927	Vinyl acetate, monomer (100%) (mil lb)	669.1	181.4	818.0	220.9
286928	Vinyl chloride, monomer (100%) (do)	6 242.5	906.0	3 584.3	553.9
286003	Other synthetic chemicals (includes acrylonitrile, cellulose acetate)	(X)	1 016.8	(X)	(D)
	Hydrocarbons used as raw materials or feedstocks:				
	Refined petroleum products:				
2911A1	Ethane (mil bbl)	37.8	236.3	18.1	178.3
2911A2	Ethylene (do)	(S)	1 799.4	(S)	1 637.9
2911A3	Propane (do)	26.2	173.6	8.6	165.3
2911A4	Propylene (do)	(S)	798.0	11.0	407.7
2911A7	Butadiene (do)	3.3	91.1	**1.1	72.6
2911A8	Other refined petroleum products (includes butane, isobutane, butylene, isobutylene, petroleum naphtha, and gas oils) (do)	6 899.9	207.6	(S)	149.3
190002	Other (includes crude oil, natural gas, and still gas)	(X)	143.2	(S)	(D)

See footnotes at end of table.

Table 3. Materials Consumed by Kind: 1987 and 1982—Con.

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987 Quantity[1]	1987 Delivered cost (million dollars)	1982 Quantity[1]	1982 Delivered cost (million dollars)
	INDUSTRY 2821, PLASTICS MATERIALS AND RESINS—Con.				
282104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., but excluding sheets, rods, tubes, and shapes ..... mil lb	(S)	849.5	*517.5	253.9
281901	Inorganic chemicals	(X)	217.4	(X)	146.4
289501	Carbon black ..... mil lb	179.0	53.2	39.8	16.4
260091	Paper and paperboard containers including shipping sacks and other paper packaging materials	(X)	142.3	(X)	93.3
970099	All other materials and components, parts, containers, and supplies	(X)	2 542.2	(X)	1 984.4
971000	Materials, containers, and supplies, n.s.k.[2]	(X)	1 022.9	(X)	593.0
	INDUSTRY 2822, SYNTHETIC RUBBER				
	Materials, containers, and supplies	**(X)**	**1 850.4**	**(X)**	**1 957.3**
	Synthetic organic chemicals:				
	Cyclic crudes and intermediates:				
286516	Styrene (100%) ..... mil lb	616.8	223.7	720.5	230.2
286513	Phenol (100%) ..... do	(D)	(D)	(D)	(D)
286505	Other cyclic crudes and intermediates (including melamine, phthalic anhydride, and benzene)	(X)	49.9	(X)	(D)
286535	Synthetic organic dyes, pigments, lakes, and toners (100%) ..... mil lb	-	-	(D)	(D)
	Other synthetic organic chemicals:				
286925	Acrylates and methacrylates, monomers (100%) ..... mil lb	(D)	(D)	(D)	(D)
286920	Alcohols, except ethyl (100%) ..... do	(D)	(D)	(D)	(D)
286923	Formaldehyde (100% HCHO) ..... do	(D)	(D)	(D)	(D)
286933	Rubber processing chemicals (accelerators, antioxidants, blowing agents, inhibitors, peptizers, etc.)	(X)	83.9	(X)	52.4
286927	Vinyl acetate, monomer (100%) ..... mil lb	(D)	(D)	(D)	(D)
286928	Vinyl chloride, monomer (100%) ..... do	-	-	(3)	(3)
286003	Other synthetic chemicals (includes acrylonitrite, cellulose acetate)	(X)	46.4	(X)	(D)
	Hydrocarbons used as raw materials or feedstocks:				
	Refined petroleum products:				
2911A1	Ethane ..... mil bbl	-	-	-	-
2911A2	Ethylene ..... do	(D)	(D)	(D)	(D)
2911A3	Propane ..... do	-	-	-	-
2911A4	Propylene ..... do	(D)	(D)	(D)	(D)
2911A7	Butadiene ..... do	(S)	516.7	11.5	795.8
2911A8	Other refined petroleum products (includes butane, isobutane, butylene, isobutylene, petroleum naphtha, and gas oils) ..... do	3.8	127.5	(D)	(D)
190002	Other (includes crude oil, natural gas, and still gas) ..... do	(X)	27.9	*2.8	*115.2
282104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., but excluding sheets, rods, tubes, and shapes ..... mil lb	25.9	9.3	75.5	18.1
281901	Inorganic chemicals	(X)	73.7	(X)	(D)
289501	Carbon black ..... mil lb	157.4	28.9	206.0	59.2
260091	Paper and paperboard containers including shipping sacks and other paper packaging materials	(X)	34.9	(X)	16.4
970099	All other materials and components, parts, containers, and supplies	(X)	353.9	(X)	*246.8
971000	Materials, containers, and supplies, n.s.k.[2]	(X)	139.5	(X)	26.5
	INDUSTRY 2823, CELLULOSIC MANMADE FIBERS				
	Materials, containers, and supplies	**(X)**	**598.4**	**(X)**	**701.9**
	Synthetic organic chemicals:				
286921	Acrylonitrile (100%) ..... mil lb	-	-		
286965	Glycols (ethylene, propylene, etc.)(100%) ..... do	(D)	(D)	(D)	(D)
286001	All other synthetic organic chemicals	(X)	(D)		
	Plastics resins:				
282135	Nylon resins (dry basis) ..... mil lb	-	-	(D)	(D)
282105	All other plastics resins (dry basis) ..... do	(D)	(D)	(D)	(D)
281900	Industrial inorganic chemicals	(X)	11.3	(X)	(D)
261105	Wood pulp, excluding wood flour (air dry) ..... 1,000 s tons	315.2	204.2	447.0	292.5
260091	Paper and paperboard containers, including shipping sacks and other paper packaging supplies	(X)	12.7	(X)	8.7
970099	All other materials and components, parts, containers, and supplies	(X)	233.2	(X)	322.7
971000	Materials, containers, and supplies, n.s.k.[2]	(X)	56.8	(X)	11.7

See footnotes at end of table.

Table 3. **Materials Consumed by Kind: 1987 and 1982**—Con.

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material		1987		1982	
			Quantity[1]	Delivered cost (million dollars)	Quantity[1]	Delivered cost (million dollars)
	INDUSTRY 2824, ORGANIC FIBERS, NONCELLULOSIC					
	Materials, containers, and supplies		**(X)**	**4 617.7**	**(X)**	**4 382.6**
	Synthetic organic chemicals:					
286921	Acrylonitrile (100%)	mil lb	814.7	197.8	742.8	283.3
286963	Caprolactam (100%)	do	1 064.3	381.4	(D)	(D)
286965	Glycols (ethylene, propylene, etc.) (100%)	do	*1 076.9	211.6	1 361.6	331.1
286517	Dimethyl terephthalate (DMT) (100%)	do	1 282.6	293.4	1 560.1	482.6
286518	Terephtalic acid (TPA) (100%)	do	1 287.4	334.9	1 385.6	435.9
286001	All other synthetic organic chemicals		(X)	(D)	(X)	(D)
	Plastics resins:					
282131	Polypropylene resins (dry basis)	mil lb	591.6	256.1	340.9	164.5
282135	Nylon resins (dry basis)	do	*243.5	163.6	240.7	182.8
282105	All other plastics resins (dry basis)	do	**175.4	84.6	(S)	50.0
281900	Industrial inorganic chemicals		(X)	(D)	(X)	(D)
261105	Wood pulp, excluding wood flour (air dry)	1,000 s tons	(D)	(D)	(D)	(D)
260091	Paper and paperboard containers, including shipping sacks and other paper packaging supplies		(X)	83.4	(X)	119.4
970099	All other materials and components, parts, containers, and supplies		(X)	790.4	(X)	481.5
971000	Materials, containers, and supplies, n.s.k.[2]		(X)	64.0	(X)	2.6

[1]For some establishments, data have been estimated from central unit values which are based on quantity-cost relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

[2]Total cost of materials of establishments that did not report detailed materials data, including establishments that were not mailed a form.

[3]For 1982, material code 286928 was included with material code 970099.

[4]For 1982, no data were reported for natural gas or still gas.

APPENDIX
Scope and Coverage and Explanation of Terms

GENERAL

The 1987 Census of Manufactures is the 32nd census of manufacturing establishments conducted in the United States. For 1987, it was conducted as part of the economic censuses, which included the censuses of mineral industries, construction industries, retail and wholesale trades, service industries, selected transportation activities, and minority-owned and women-owned businesses, under authority of title 13 of the United States Code. Title 13 specifies that an economic census be conducted every 5 years to cover years ending in 2 and 7.

SCOPE AND COVERAGE

Establishment Basis of Reporting

The census of manufactures is conducted on an establishment basis. All manufacturing establishments with one paid employee or more at any time during the year are covered by the census of manufactures. Therefore, a company operating at more than one location is required to file a separate report for each location. This report excludes information for separately operated administrative offices, warehouses, garages, and other auxiliary units which service manufacturing establishments of the same company. Where these auxiliary operations are conducted at the same location as the manufacturing operation, they are usually included in the report for the operating manufacturing establishment.

Use of Administrative Records

From a universe of approximately 350,000 manufacturing establishments in the 1987 Census of Manufactures, approximately 150,000 small single-establishment companies were excused from filing reports. Selection of the small establishment nonmail cases was done on an industry-by-industry basis. A variable cutoff was used to determine those establishments for which administrative records were to be used in place of a census report. The cutoffs were selected so the administrative-record cases would account for approximately 3 percent or less of the value of shipments for the industry. These cutoffs were then adjusted so that all single-establishment companies with less than 5 employees were excluded from the mail canvass, while all establishments with more than 20 employees were included. Where establishments in the 5 to 20 employee size range were included in the mail canvass, an abbreviated census form was frequently used.

For these nonmail establishments, (and a small number of larger establishment whose reports were not received at the time the data were tabulated) data on employment, payroll, and receipts were obtained from administrative records of other government agencies rather than from census forms. The administrative-record information was then used in conjunction with industry averages to estimate the data for these establishments. The value of shipments and cost of materials were not distributed among specific products and materials but were included in the product and material "not specified by kind" (n.s.k.) categories.

EXPLANATION OF TERMS

Number of establishments and companies–A separate report was required for each manufacturing establishment (plant) with one employee or more. An establishment is defined as a single physical location where manufacturing is performed. A company, on the other hand, is defined as a business organization consisting of one establishment or more under common ownership or control.

All employees–Includes all full-time and part-time employees on the payrolls at any time during the year. Included are all persons on paid sick leave, paid holidays, and paid vacations. Officers of corporations are included as employees; proprietors and partners of unincorporated firms are excluded. The "all employees" number is the average number of production workers plus the number of other employees in mid-March. The number of production workers is the average of those for midmonth payroll periods of March, May, August, and November.

Production workers–Includes workers up through the working-supervisor level engaged in fabricating, processing, assembling, inspecting, receiving, packing, warehousing, shipping (but not delivering), maintenance, repair, janitorial, guard services, product development, auxiliary production for plant's own use (e.g., powerplant), recordkeeping, and other closely associated services. Truckdrivers delivering ready-mixed concrete are also included in production workers.

Other employees–Includes nonproduction personnel, including those engaged in the following activities: supervision above working-supervisor level, sales (including driver/salespersons), sales delivery (truckdrivers and helpers), advertising, credit collection, installation and

servicing of own product, clerical and routine office functions, executive, purchasing, finance, legal, personnel (including cafeteria, etc.), professional, and technical employees.

Payroll–Includes the gross earnings for the "employees" defined above, such as salaries, wages, commissions, dismissal pay, bonuses, vacation and sick leave pay, and compensation in kind, prior to such deductions as employees' Social Security contributions, withholding taxes, group insurance, union dues, and savings bonds. Respondents were told that in reporting they could follow the definition of payrolls used for calculating the Federal withholding tax.

Production-worker hours–Covers hours worked or paid for at the plant, including actual overtime hours (not straight-time equivalent hours). It excludes hours paid for vacations, holidays, or sick leave when the employee was not at the plant.

Cost of materials–Refers to direct charges actually paid or payable for items consumed or put into production during the year, including freight charges and other direct charges incurred by the establishment in acquiring these materials. It includes the cost of materials or fuels consumed, regardless of whether they were purchased by the individual establishment from other companies, transferred to it from other establishments of the same company, or withdrawn from inventory during the year.

The important components of this cost item are (a) all raw materials, semifinished goods, parts, containers, scrap, and supplies put into production or used as operating supplies and for repair and maintenance during the year; (b) electric energy purchased; (c) fuels consumed for heat, power, or generating electricity; (d) work done by others on materials or parts furnished by manufacturing establishments (contract work); and (e) products bought and resold in the same condition.

Specific materials consumed (table 3)–In addition to the total cost of materials which every establishment was required to report, information was also collected for most manufacturing industries on the consumption of major materials used in manufacturing. These inquiries were restricted to those materials which were important parts of the cost of production in a particular industry and for which cost information was available from manufacturers' records. Establishments consuming less than a specified amount (usually $10,000) of a specific material were not requested to report consumption of that material separately. Also, the cost of materials for the small establishments for which administrative records were used was estimated as "not specified by kind" (n.s.k.).

Value of shipments and other receipts–Generally refers to received or receivable net selling values, f.o.b. plant (exclusive of freight and taxes), of all products shipped, both primary and secondary, as well as all miscellaneous receipts such as receipts for contract work performed for others, installation and repair receipts, sale of scrap, and sale of products bought and resold without further processing. Included are all items made by or for the establishment from materials owned by it whether sold, transferred to other plants of the same company, or shipped on consignment. The net selling value of products made in one plant on a contract basis from materials owned by another was reported by the plant providing the materials.

In a few industries, the value of production or value of work completed is used instead of value of shipments. These industries are identified in the introduction and are footnoted in table 1.

In the case of multiunit companies, the manufacturer was requested to report the value of products transferred to other establishments of the same company at full economic or commercial value, that is, including not only the direct costs of production but also a reasonable proportion of "all other costs" (including company overhead and profit).

Shipments or production of individual products (table 2)–In the 1987 census, detailed shipment information was collected for approximately 11,000 individual products. These products are identified by a seven-digit code and are grouped into approximately 1,500 classes of products, which in turn are primary to 459 four-digit industries. Data at the five-digit product-class level have been collected each year as part of the annual survey of manufactures. Information at the seven-digit level, collected for many industries in the current industrial reports program, is not included in this table.

Value added by manufacture–This measure of manufacturing activity is derived by subtracting the cost of materials, supplies, containers, fuel, purchased electricity, and contract work from the value of shipments for products manufactured plus receipts for services rendered. The result of this calculation is then adjusted by the addition of value added by merchandising operations (that is, the difference between the sales value and cost of merchandise sold without further manufacturing, processing, or assembly) plus the net change in finished goods and work-in-process inventories between the beginning and end of the year.

For those industries where value of production is collected instead of value of shipments (see footnote in table 1), value added is adjusted only for the change in work-in-process inventories between the beginning and end of the year. For those industries where value of work done is collected, the value added does not include an adjustment for the change in finished goods or work-in-process inventories.

Value added avoids the duplication in the figure for value of shipments which results from the use of products of some establishments as materials by others. Value

added is considered to be the best value measure available for comparing the relative economic importance of manufacturing among industries and geographic areas.

Expenditures for new plant and equipment–Establishments in operation and any known plants under construction were asked to report their expenditures for (a) permanent additions and major alterations to manufacturing establishments and (b) new machinery and equipment used for replacement and additions to plant capacity if they are of the type for which depreciation accounts are ordinarily maintained.

These totals exclude expenditures for used plant and equipment, expenditures for land, and cost of maintenance and repairs charged as current operating expenses. Data for used plant and equipment will be published in the final industry bulletin.

End-of-year inventories–Comprised of (a) finished products; (b) work-in-process; and (c) materials, supplies, fuels, etc. Beginning in 1982, respondents were asked to report their inventories at (the lower of) cost or market prior to adjustment to LIFO cost. This is a change from prior years in which respondents were permitted to value their inventories using any generally accepted accounting method. Therefore, 1982 through 1987 data for inventories are not strictly comparable to prior-year data.

Specialization and coverage ratios–An establishment is classified in a particular industry if its shipments of primary products of the industry exceed in value its shipments of the products of any other single industry. An establishments' shipments include those products assigned to an industry (primary products), those considered primary to other industries (secondary products), and receipts for miscellaneous activities (merchandising, contract work, resales, etc.). The following ratios have been developed to measure the relationship of primary product shipments to the data on shipments for the industry shown in table 1 and data on product shipments shown in table 2.

Specialization ratio–Represents the ratio of primary product shipments to total product shipments (primary and secondary, excluding miscellaneous receipts) for the establishments classified in the industry.

Coverage ratio–Represents the ratio of primary products shipped by the establishments classified in the industry to the total shipments of such products that are shipped by all manufacturing establishments, wherever classified.